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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/758,381	01/15/2004	Stephen Wayne Tefft	121657-3/11944 (21635-009)	5431
31450 7590 04/26/2005 MCNEES WALLACE & NURICK LLC 100 PINE STREET P.O. BOX 1166 HARRISBURG, PA 17108-1166			EXAMINER BAREFORD, KATHERINE A	
			ART UNIT 1762	PAPER NUMBER

DATE MAILED: 04/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/758,381

Applicant(s)

TEFFT ET AL.

Examiner

Katherine A. Bareford

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 March 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 12-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers***Claims 1-11 are canceled*

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. The Response to Notice of Non-Compliant Amendment of March 15, 2005 and the amendment of January 21, 2005 have been received. It is noted that claims 12-25 are now present.

### *Specification*

2. The objection to the disclosure is withdrawn due to the provision of the US Patent number at paragraph [00005] of the specification.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 12-17 and 19-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moore al (US 2003/0161946) in view of Knight, et al "HVOF Sprayed 80/20 NiCr Coatings--Process Influence Trends" (hereinafter Knight Article).

Claim 12: Moore teaches a method for forming a deposit on a deposition substrate. Paragraphs [0018] – [0019]. A deposition gun is provided. Paragraphs [0019] – [0020]. The gun can be an HVOF (high velocity oxy fuel) spray gun. Paragraphs [0019] – [0020]. The gun can be provided with a flowing coolant. Paragraph [0025]. Moore teaches to control the flow rate of gases to the spray gun (which would include fuel gas and oxidizer gas). Paragraph [0033]. The flow rate of the powder to the spray gun is also controlled. Paragraph [0033]. The flow rate of the coolant flow is also controlled, thus controlling the cooling capacity of the coolant flow. Paragraph [0033]. Moore further teaches to monitor the coating process using sensors to adjust the operation to stay within selected parameters (set point) in a feedback control system. See paragraphs [0033] – [0034].

Claim 14, 21: the coolant flow rate is controlled. Paragraph [0033].

Claim 16, 23: monitored features can be used to provide feedback to an operator for allowing the operator to make adjustments. Paragraph [0034].

Claim 17, 24: monitored features can be used to automatically adjust the operation to stay within desired parameters. Paragraph [0034].

Claim 19: Moore teaches the features as in claim 12 above. Furthermore, the coolant can be water. Paragraph [0025].

Moore teaches all the features of these claims except (1) the specific features that are measured and used for feedback control (claim 12-14, 19-21), (2) the features of the HVOF spray gun (claim 15, 17, 20, 24) and (3) the instrumentation array (claim 16, 23).

Knight Article teaches the use and testing of an HVOF apparatus. See page 159. HVOF processes are taught to provide a deposition gun that burns a mixture of fuel gas and an oxidizer (oxygen) to form a deposition gas flow, mix a powder into the deposition gas flow to form a deposition mixture flow and project the deposition mixture flow therefrom. See page 159. The mixture of fuel and oxidizer is burned in a combustion chamber to provide a pressured deposition gas flow. Page 159. The gas flow is mixed with the pressured gas flow in a mixing area. See page 159. The mixing area can be downstream of the combustion chamber. See page 159. A deposition flow director receives the deposition mixture and directs towards the substrate (the constricting nozzle). Page 159. The gun is taught as being provided with a flowing coolant, which would pass through a cooling structure. Page 159 (air or water). Knight Article teaches that important variables for coating include fuel and oxygen ratio, pressure and total flow; the feed rate (flow rate) of the powder; and the coolant medium features, including temperature and flow rate. See page 159.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Moore to specifically monitor and control the flow rate of the fuel, oxidizer, and powder, and the flow rate and temperature of the coolant flow and use an HVOF gun as suggested by Knight Article in order to provide an optimum

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final coating product, because Moore teaches coating using an HVOF spray gun system and to monitor various parameters of the spray system and provide feedback control to keep these parameters at optimum positioning, and Knight Article teaches that desirable features to control and keep at a specific setting include the flow rate of the fuel, oxidizer, and powder, and the flow rate and temperature of the coolant flow when coating with an HVOF spray gun and conventional features of such a HVOF gun. Furthermore, it would further have been obvious to modify the references to provide an instrumentation array of the measurements of these features in order to provide a desirable adjustment of the features, because Moore teaches that the controller for monitoring the coating process can provide feedback to an operator for making adjustments, which would indicate that some type of instrumentation array would be needed to show results and allow adjusting. Furthermore, it would further have been obvious to modify the references to provide an automatically controllable fuel source, oxidizer source, powder and coolant source, in order to provide a desirable adjustment of the features, because Moore teaches that the controller for monitoring the coating process can be used to provide automatic adjustments, which would indicate that the materials to be supplied would need a system that allows automatic control of the materials to be provided.

6. Claims 18 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moore in view of Knight Article as applied to claims 12-17 and 19-24 above, and further in view of Nakagawa et al (US 5958522).

Moore in view of Knight Article teaches all the features of these claims except the fuel to oxidizer ratio of 2.2-2.6. Knight Article does teach that for the HVOF system the fuel gas can be hydrogen and the oxidizer can be oxygen. Page 159.

However, Nakagawa teaches that when performing an high speed flame spraying with the fuel gas as hydrogen and the oxidizer as oxygen, a desirable ratio of hydrogen to oxygen is 2.0:1 to 2.6:1. Column 1, lines 5-15 and column 6, line 55 through column 7, line 5.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Moore in view of Knight Article to use a hydrogen:oxygen ratio as suggested by Nakagawa in order to provide an optimum final coating product, because Moore in view of Knight Article teaches coating using an HVOF spray gun system and that the fuel can be hydrogen and the oxidizer can be oxygen, and Nakagawa teaches when performing high speed flame spraying with a hydrogen fuel and oxygen oxidizer, a desirable hydrogen:fuel ratio can be 2.6:1, for example.

7. The rejection of claims 12-17 under 35 U.S.C. 103(a) as being unpatentable over Knight, et al "HVOF Sprayed 80/20 NiCr Coating--Process Influence Trends"

(hereinafter Knight Article) in view of Packer et al (US 4613259) is withdrawn due to applicant's arguments of Jan. 21, 2005.

8. The rejection of claims 18 under 35 U.S.C. 103(a) as being unpatentable over Knight Article in view of Packer as applied to claims 12-17 above, and further in view of Nakagawa et al (US 5958522) is withdrawn due to applicant's arguments of Jan. 21, 2005.

*Response to Arguments*

9. Applicant's arguments filed Jan. 21, 2005 have been fully considered but they are not persuasive.

As to the rejection using Moore in view of Knight Article, as to applicant's arguments at pages 8-9 of the Remarks as to the teaching of Knight Article, the Examiner has reviewed these arguments, however, the rejection is not overcome. The rejection is a combination of Moore and Knight Article. Moore specifically teaches to control "all the components of the system" (see paragraphs [0032] and [0033]) and that the controllers monitor and adjust "in response to variations in temperature, fluctuations in coating process parameters, the rate of coating deposition or any other detectable variations in the coating process" (paragraph [0034]). Thus all components and variations in the coating process parameters and coating process are suggested to be monitored and adjusted. Knight Article, at page 159, specifically teaches known



variables that affect the coating process. Thus, the combination of the reference clearly suggest that these known variables that affect the coating process should be monitored and adjusted. As to the argument that only the ratio of fuel flow rate and oxygen flow rate is listed as of interest, since the ratio can vary, the resulting individual fuel and oxygen flow rate will necessarily vary. As to applicant's arguments at pages 9-10 of the Remarks as to the set-point controlling, the Examiner has reviewed these arguments, however, the rejection is not overcome. Moore teaches set-point controlling of various features of the coating system at paragraphs [0032] – [0034]. As discussed above, in these paragraphs Moore provides the suggestion that all components and variations in the coating process parameters and coating process are to be monitored and adjusted. Knight Article, at page 159, specifically teaches known variables that affect the coating process. Thus, the combination of the reference clearly suggest that these known variables that affect the coating process should be monitored and adjusted using set-point controlling. As to applicant's arguments at page 10 of the Remarks as to the comparison in paragraph [0029], the Examiner has reviewed these arguments, however, the rejection is not overcome. This comparison is to a D-gun or an uncontrolled system, and thus is not compared to the suggestion of Moore in view of Knight Article. As to applicant's arguments at page 10 of the Remarks as to claims 13-14, the Examiner has reviewed these arguments, however, the rejection is not overcome. Moore as discussed above suggests monitoring and adjusting variables, including flow rates of coolant fluid (paragraphs [0033] – [0034]) and Knight also teaches that flow rate of coolant and

its temperatures are system affecting variables. As to applicant's arguments at page 10 of the Remarks as to claim 15, the Examiner has reviewed these arguments, however, the rejection is not overcome. As to the features of claim 15, including the combustion chamber, mixer, flow director and cooling structure, all are described in the rejection above in the listing of features taught by Knight of a conventional HVOF gun at page 159. As to applicant's arguments at page 10 of the Remarks as to claim 16, the Examiner has reviewed these arguments, however, the rejection is not overcome. As to the teaching or suggestion of the instrumentation array it was provided in the rejection as "it would further have been obvious to modify the references to provide an instrumentation array of the measurements of these features in order to provide a desirable adjustment of the features, because Moore teaches that the controller for monitoring the coating process can provide feedback to an operator for making adjustments, which would indicate that some type of instrumentation array would be needed to show results and allow adjusting." See the rejection above. As to applicant's arguments at page 10 of the Remarks as to claim 17, the Examiner has reviewed these arguments, however, the rejection is not overcome. As to the teaching or suggestion of the sources, it was provided in the rejection as "it would further have been obvious to modify the references to provide an automatically controllable fuel source, oxidizer source, powder and coolant source, in order to provide a desirable adjustment of the features, because Moore teaches that the controller for monitoring the coating process can be used to provide automatic adjustments, which would indicate that the materials

to be supplied would need a system that allows automatic control of the materials to be provided.” As to applicant’s arguments at pages 10-13 of the Remarks as to the combination of the references, the Examiner has reviewed these arguments, however, the rejection is not overcome. Both references teach thermal spraying, including with HVOF guns, and that variables are present that affect the coating results, with Moore teaches a monitoring and adjusting system. Thus, they are in the same thermal spraying field of endeavor. As to the combination of the references, as discussed above, the rejection is a combination of Moore and Knight Article. Moore specifically teaches to control “all the components of the system” (see paragraphs [0032] and [0033]) and that the controllers monitor and adjust “in response to variations in temperature, fluctuations in coating process parameters, the rate of coating deposition or any other detectable variations in the coating process” (paragraph [0034]). Thus all components and variations in the coating process parameters and coating process are suggested to be monitored and adjusted. Knight Article, at page 159, specifically teaches known variables that affect the coating process. Thus, the combination of the reference clearly suggest that these known variables that affect the coating process should be monitored and adjusted.

As to applicant’s arguments at pages 13-14 of the Remarks as to the rejection using Moore, Knight Article and Nakagawa to reject claim 18, the Examiner has reviewed these arguments, however, the rejection is not overcome. While the gun of Nakagawa may not have the exact shape of the HVOF gun of Knight Article, it is a gun

for achieving high speed flame combustion, and the combination of gases is desired to produce combustion efficiency. While Moore/Knight Article may provide that propylene/oxygen produces good coatings and a different fuel/oxidizer ratio, Nakagawa teaches a different fuel with a different fuel/oxidizer ratio also produces good coatings. Knight Article at page 159 teaches that fuel type is a known variable. While the references may teach that different fuel/oxidizers and different ratios may all produce good coatings, this does not prevent a substitution of one for another. As discussed in MPEP 2144.06 it is obvious to substitute art recognized equivalents for the same purpose. Here Nakagawa indicates ~~that~~ known use of either oxygen/propylene or oxygen/hydrogen fuel/oxidizer mixes. See column 6, lines 5-10.

### *Conclusion*

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date

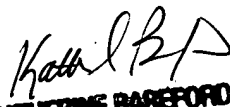
of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:00-3:30) with the First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and for After Final communications.

Other inquiries can be directed to the Tech Center 1700 telephone number at (571) 272-1700.

Furthermore, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
KATHERINE BAREFORD  
PRIMARY EXAMINER